

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
16 August 2001 (16.08.2001)

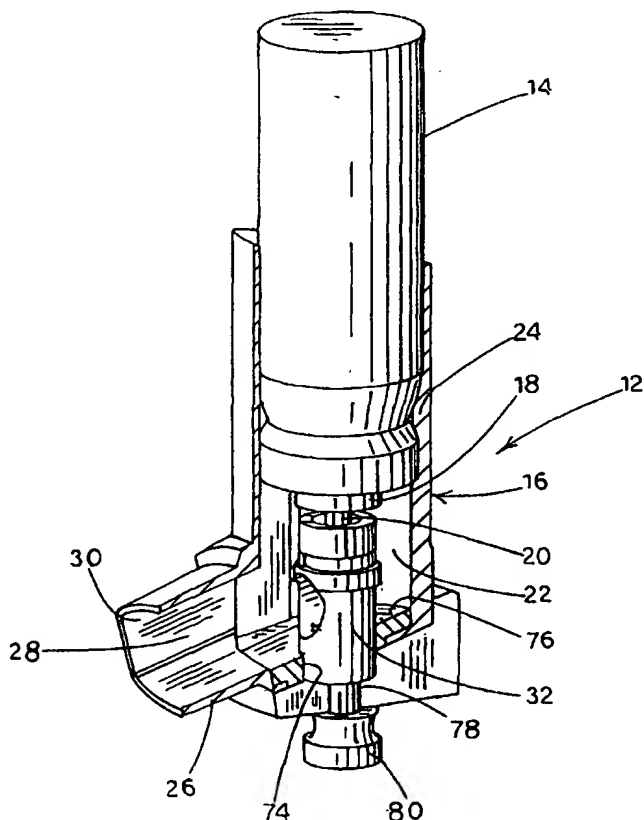
PCT

(10) International Publication Number
WO 01/58508 A3

- (51) International Patent Classification⁷: **B05B 1/00**, A61M 15/00
- (21) International Application Number: PCT/US01/04158
- (22) International Filing Date: 8 February 2001 (08.02.2001)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
0002798.7 9 February 2000 (09.02.2000) GB
- (71) Applicant (for all designated States except US): **GLAXO GROUP LIMITED** [GB/GB]; Glaxo Wellcome House, Berkeley Avenue, Greenford, Middlesex UB6 0NN (GB).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): **ZHAO, Junguo** [US/US]; Glaxo Wellcome Inc., Five Moore Drive, P.O. Box 12298, Research Triangle Park, NC 27709 (US).
- (74) Agents: **LEVY, David, J. et al.**; Glaxo Wellcome Inc., Five Moore Drive, P.O. Box 13398, Research Triangle Park, NC 27709 (US).
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian

[Continued on next page]

(54) Title: ACTUATOR NOZZLE FOR METERED DOSE INHALER



(57) Abstract: An actuator for a metered dose inhaler containing a liquefied propellant and a medicament. The actuator comprises a nozzle block having a fluid flow path extending therethrough, the fluid flow path defined by an internal chamber having an inlet and an outlet; the outlet being defined in a portion of said nozzle block and comprising an exit channel extending therethrough. The exit channel has a narrow portion wherein the diameter of the channel is 0.3 mm or less, the narrow portion being .5 mm or less in length; and the narrow portion optionally including a constriction having a diameter of less than 0.3 mm.

WO 01/58508 A3



patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European
patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE,
IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF,
CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

(88) Date of publication of the international search report:
2 May 2002

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 01/04158

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B05B1/00 A61M15/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B05B A61M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 322 037 A (BERGEMANN UWE ET AL) 30 March 1982 (1982-03-30) column 1, line 7 - line 43 column 4, line 50 - line 54; figures ---	1,2,5,7, 9,11,21
X	US 5 497 944 A (DUNNE STEPHEN T ET AL) 12 March 1996 (1996-03-12) column 6, line 41 - line 46 column 14, line 18 - line 40 column 15, line 55 - line 60; figures ---	1-7, 9-13,15, 18-20 8,21
A	US 4 074 861 A (JEGEN JAMES M ET AL) 21 February 1978 (1978-02-21) column 4, line 6 - line 19; figures ---	1,2,5, 7-15, 18-20 21
	--- -/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

A document defining the general state of the art which is not considered to be of particular relevance

E earlier document but published on or after the international filing date

L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

O document referring to an oral disclosure, use, exhibition or other means

P document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

S document member of the same patent family

Date of the actual completion of the international search

14 January 2002

Date of mailing of the international search report

21/01/2002

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Brévier, F

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 01/04158

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 412 524 A (TOKO YAKUHIH KOGYO KK) 13 February 1991 (1991-02-13)	1,2,8,9
A	column 5, line 5 - line 11; figures ----	21
A	GB 2 276 101 A (CSB MOULDS LTD) 21 September 1994 (1994-09-21) page 6, line 12 - line 14; figures ----	1,13-17, 19-21
A	US 4 647 013 A (GIACHINO JOSEPH M ET AL) 3 March 1987 (1987-03-03) abstract column 2, line 58 - line 60 -----	5,23

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 01/04158

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 4322037	A	30-03-1982	DE 2849599 A1	22-05-1980
			BE 880036 A1	03-03-1980
			FR 2445807 A1	01-08-1980
			FR 2446311 A1	08-08-1980
			GB 2036188 A ,B	25-06-1980
			IT 1127235 B	21-05-1986
			JP 55070368 A	27-05-1980
			JP 58050540 B	11-11-1983
			NL 7908276 A	19-05-1980
US 5497944	A	12-03-1996	AT 160947 T	15-12-1997
			AT 189413 T	15-02-2000
			AU 650870 B2	07-07-1994
			AU 7548491 A	21-10-1991
			BR 9106249 A	09-11-1993
			CA 2078683 A1	22-09-1991
			CA 2206753 A1	22-09-1991
			CN 1061362 A ,B	27-05-1992
			CN 1199009 A	18-11-1998
			CZ 283820 B6	17-06-1998
			DE 69128419 D1	22-01-1998
			DE 69128419 T2	16-04-1998
			DE 69131966 D1	09-03-2000
			DE 69131966 T2	20-07-2000
			DK 521061 T3	30-03-1998
			DK 627230 T3	26-06-2000
			EP 0521061 A1	07-01-1993
			EP 0627230 A2	07-12-1994
			ES 2109943 T3	01-02-1998
			ES 2141786 T3	01-04-2000
			FI 924216 A	21-09-1992
			WO 9114468 A1	03-10-1991
			GB 2256805 A ,B	23-12-1992
			GR 3026065 T3	29-05-1998
			GR 3033317 T3	29-09-2000
			HK 1005059 A1	18-12-1998
			HR 921357 A1	31-10-1995
			HU 66175 A2	28-09-1994
			IE 910929 A1	25-09-1991
			IL 97619 A	26-05-1995
			JP 2630347 B2	16-07-1997
			JP 5509241 T	22-12-1993
			KR 139652 B1	01-07-1998
			NO 303206 B1	15-06-1998
			NZ 237502 A	25-02-1994
			PL 165926 B1	31-03-1995
			PT 97098 A ,B	30-04-1993
			SG 45171 A1	16-01-1998
			SI 9110500 A ,B	29-02-1996
			SK 280225 B6	08-10-1999
			RU 2104048 C1	10-02-1998
			US 5662271 A	02-09-1997
			ZA 9102057 A	27-05-1992
US 4074861	A	21-02-1978	NONE	
EP 0412524	A	13-02-1991	JP 2922935 B2	26-07-1999
			JP 3198866 A	30-08-1991

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 01/04158

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0412524	A	DE 69001223 D1	06-05-1993
		DE 69001223 T2	08-07-1993
		EP 0412524 A1	13-02-1991
		US 5064122 A	12-11-1991
<hr/>			
GB 2276101	A	21-09-1994	NONE
<hr/>			
US 4647013	A	03-03-1987	AU 628140 B2
			10-09-1992
			AU 5125890 A
			09-08-1990
			AU 5178886 A
			28-08-1986
			BR 8600322 A
			07-10-1986
			CA 1275611 A1
			30-10-1990
			DE 3668230 D1
			15-02-1990
			EP 0208386 A1
			14-01-1987
			ES 551825 D0
			01-11-1987
			ES 8800396 A1
			01-01-1988
			ES 557440 D0
			01-09-1987
			ES 8708043 A1
			16-11-1987
			JP 1943657 C
			23-06-1995
			JP 6071790 B
			14-09-1994
			JP 61193862 A
			28-08-1986
			MX 163889 B
			30-06-1992
			US 4628576 A
			16-12-1986
			US 4756508 A
			12-07-1988
<hr/>			